

KICK-START AND UPGRADE¹

How countries throughout Europe, the Middle East and North Africa may benefit soon from “clean power from deserts”

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Countries throughout Europe, the Middle East and North Africa (EUMENA) may begin to benefit quite soon from solar power and wind power in the deserts of the Middle East and North Africa (MENA). *It is not necessary to wait until the proposed HVDC supergrid has been built.*

A “kick-start and upgrade” strategy would work like this:

1. **Kick-start** the DESERTEC scenario by building CSP plants and wind farms in southern Europe and in MENA and transmit the clean electricity throughout EUMENA, **using existing transmission lines.**
2. As the quantities of electricity increase (or in anticipation of those increases), **upgrade** the transmission grid:²
 - By removing bottlenecks.
 - By installing smart electronics (eg “FACTS” technologies).
 - By converting existing HVAC transmission lines to HVDC.³
 - By installing new HVDC transmission lines.

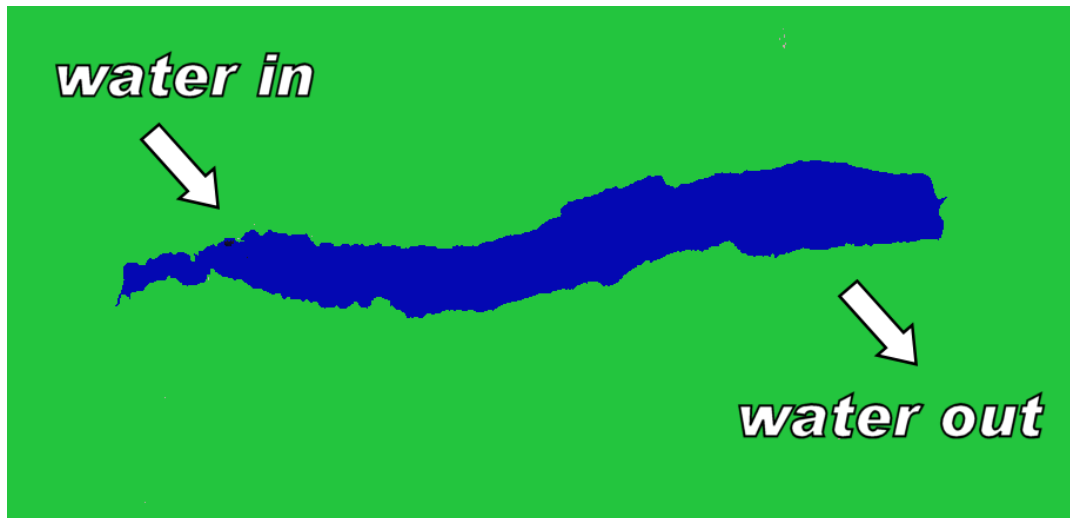
It is feasible to kick-start the DESERTEC scenario using existing transmission lines because, in some respects, a transmission grid is like a lake or pond: it is possible to put water in at one end of a lake and take the same amount of water out at the other end so that, in effect, the water has been transmitted from one end to the other without it being necessary to move it all that distance. Applied to an HVAC transmission grid, this analogy means that it should be possible to “transfer” electricity over a long distance with much smaller losses than if the electricity had to travel the entire distance. More generally, it means greater security of supplies because there would be less dependence on the integrity of long-distance transmission lines. These things are described and discussed on our page about *the cascading principle*.⁴

¹ An electronic copy of this document, with live links, may be downloaded from <http://www.trec-uk.org.uk/resources.htm#PDFdocs>.

² See http://www.trec-uk.org.uk/elec_eng/upgrade_hvac.html.

³ Which can increase their transmission capacity by a factor of 3 or more (see “Transmission and distribution networks: AC versus DC”, D. M. Larruskain *et al.*, Department of Electrical Engineering, University of the Basque Country, Bilbao, Spain, http://www.trec-uk.org.uk/reports/larruskain_HVAC_to_HVDC.pdf, PDF, 176 KB).

⁴ See http://www.trec-uk.org.uk/elec_eng/cascade.html.



The end result of the kick-start and upgrade strategy is likely to be an HVDC supergrid, much as envisaged in the “TRANS-CSP” report from the German Aerospace Centre.⁵ But the advantages of the incremental strategy are:

- Providing there is a single market for electricity throughout EUMENA (or, at least, in Europe),⁶ it would mean that customers throughout EUMENA could begin to benefit from “desert” electricity as soon as the plants have been built. It would not be necessary to wait until new HVDC lines had been built.⁷
- This would give greater confidence to business people and investors, giving them more incentive to build the CSP plants and wind farms.
- It would also provide a commercial incentive to upgrade the existing grid by removing bottlenecks, by installing smart electronics, by converting HVAC lines to HVDC and by adding new HVDC lines.

If countries throughout EUMENA can begin to benefit from DESERTEC on relatively short timescales, this would be helpful to commercial and domestic consumers in those countries and it would be helpful to politicians trying to ensure that there are sufficient supplies of electricity, trying to meet agreed targets for renewable energy, and trying to meet agreed targets for reductions in CO₂ emissions.

⁵ A copy may be downloaded from <http://www.trec-uk.org.uk/reports.htm>.

⁶ Both the European Commission and the UK government are in favour of a single market for electricity throughout Europe and that single market is taking shape now. It would be good to see it extended to the whole of EUMENA.

⁷ It would, of course, be necessary to ensure that the interests of local people in host countries are protected, perhaps by ensuring that they have first call on supplies of solar electricity and at reasonable prices.